

# Proceedings of the II Iberian Nuclear Astrophysics Meeting on Compact Stars,

September 22<sup>nd</sup>-23<sup>rd</sup> 2011, Salamanca, Spain.

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## PREFACE

The second Iberian Nuclear Astrophysics meeting was held at the University of Salamanca, Spain on September 22<sup>nd</sup>-23<sup>rd</sup> 2011. This volume index contains the links to most of the presentations delivered at this international workshop. This meeting was the second in the series following the previous I Encuentro Ibérico de Compstar, held at the University of Coimbra, Portugal in 2010.

The main purpose of this meeting was to strengthen the scientific collaboration between the participants of the Iberian and the rest of the southern European branches of the European Nuclear Astrophysics network, formerly, COMPSTAR. This ESF (European Science Foundation) supported network has been crucial in helping to make a broader audience for the the most interesting and relevant research lines being developed currently in Nuclear Astrophysics, especially related to the physics of neutron stars. It is indeed important to emphasize the need for a collaborative approach to the rest of the scientific communities so that we can reach possible new members in this interdisciplinary area and as outreach for the general public.

The program of the meeting was tailored to theoretical descriptions of the physics of neutron stars although some input from experimental observers and other condensed matter and optics areas of interest was also included. The main scientific topics included:

- Magnetic fields in compact stars
- Nuclear structure and in-medium effects in nuclear interaction
- Equation of state: from nuclear matter to quarks
- Importance of crust in the evolution of neutron stars
- Computational simulations of collapsing dense objects

- Observational phenomenology

In particular, leading experts from the computational simulation of core-collapse supernovae and the effect of hadronquark phase transitions developed specialized review talks. Prospects in future observations or a more dilute classification of magnetars were also discussed. The importance of the equation of state, three-body forces, finite nuclei, phenomenological fermionic interaction models, and the microphysics inputs of different many-body approaches to some very important quantities as the symmetry energy were reviewed and discussed from either the non-relativistic to the relativistic framework. The importance of the crust with the existence of a crystallized structure and vortex-crust pinning were some of the important subjects discussed in the context of cooling and field dynamics.

Finally, some condensed matter and optics talks presented us the rich insight that Cold Atom Physics can give us on low-density interactions and the new and very intense laser Petawatt beams can test matter under strong external fields, respectively.

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Of course we thank those who have contributed to make this meeting a nice occasion to gather and start to develop fruitful collaborations. To them go our grateful acknowledgments.

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